

Lake Elsinore In-Lake Nutrient Reduction Alternatives Analysis

Presentation to the TMDL Task Force

May 13, 2024

Presentation by Steve Wolosoff, GEI Consultants



Agenda

- Project Overview
- Condition Assessment
- Sediment Study
- Evaluation of Options



Project Objective

- Definitive recommendation for project(s) to replace LEAMS and provide necessary N and P offsets to meet current and future TMDLs and maximize other benefits
- Plan of action in near-term to maximize performance of the existing system



Technical Experts

- Steve Wolosoff, Craig Wolf, AJ Reyes, Larry Rodriguez, GEI (Project management and direction)
- Alex Horne (Senior advisor)
- Michael Anderson (Hydrodynamics lead)
- Andy Komor, PACE (Engineering lead)
- Chris Stransky and John Rudolph, WSP (Sediment study lead)



Schedule

- Project initiated in January
- Feb-May: Identification of alternatives, scientific analysis, vendor coordination, preliminary engineering
- June: Condition Assessment, Sediment study sample collection, evaluation criteria
- July-Sept: Engineering and cost analysis
- Oct: Draft report and recommendation
- Dec: Final report and recommendation



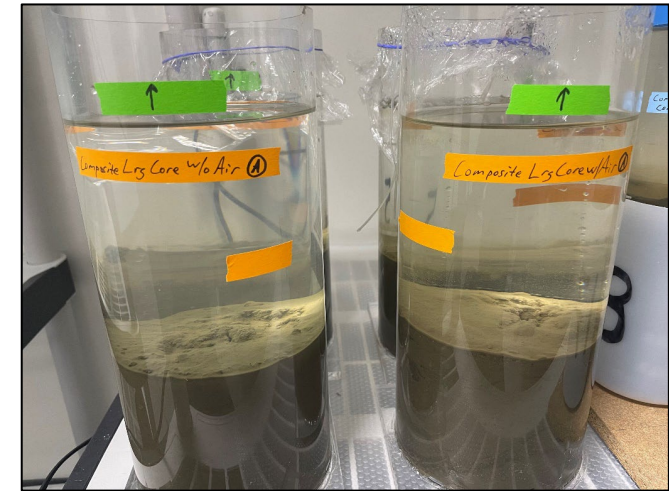
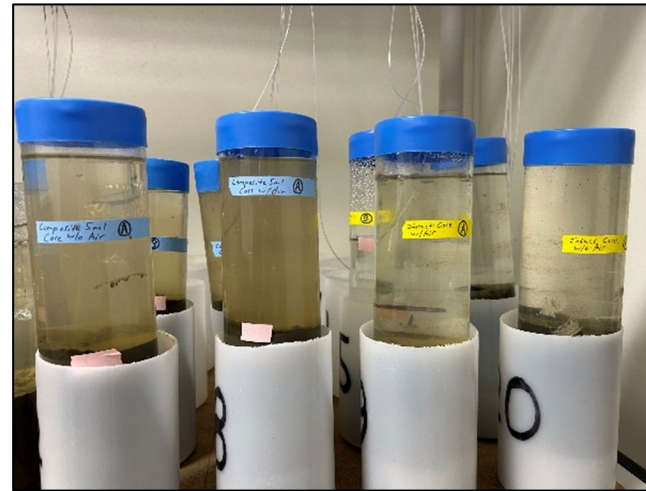
LEAMS Condition Assessment

- Estimate remaining useful life of the existing system
- Field visit planned for early June
 - Test air flow and pressure for each compressor
 - Test energy consumption under varying operating conditions
 - Assess noise and vibration
 - Atlas Copco to participate to inspect mechanical components
 - Inspection of HPDE pipelines and straps
- Collect information needed to consider repurposing existing equipment in future



Sediment Study Objectives

- Compute oxygen demand from bottom sediments in Lake Elsinore - provides criteria for oxygenation options development
- Determine the rate of nutrient flux from bottom sediments with and without oxygen – estimate of potential internal load reduction with oxygenation
- Measure nutrients enrichment in the lake bottom sediment – additional support for estimates of potential nutrient load reduction with oxygenation or chemical addition options

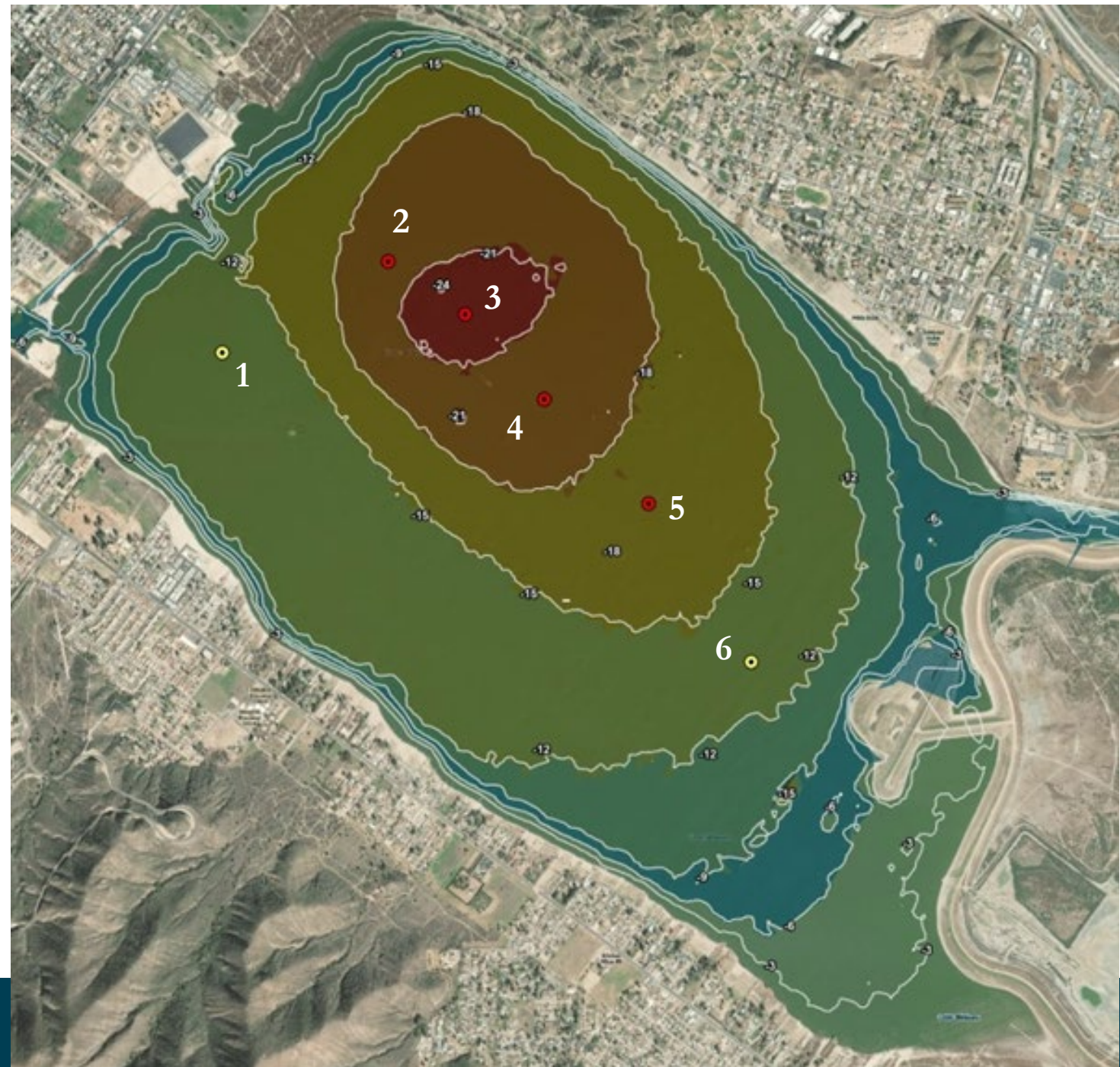
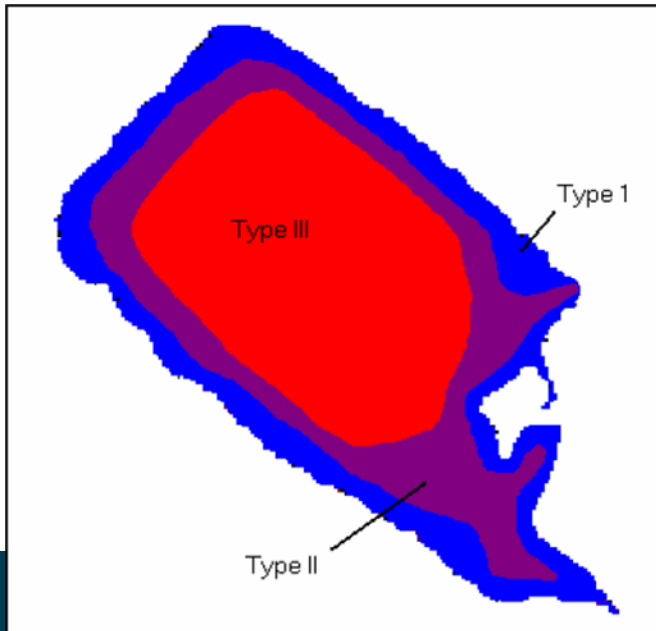


Photos taken by John Rudolph of WSP lab setup



Sites

- Two sites in Type 2 zone and four sites in Type 3 zone (after Anderson, 2001)



Set Load Reduction Targets

- Reduction target = Existing Load minus Allocation
- Assumed existing load based on nutrient concentrations in runoff from long-term data provides conservatism
- Runoff: 0.4 mg/L TP; 1.7 mg/L TN
- Recycled Water: 0.7 mg/L TP; 7.0 mg/L TN
- Recent reductions from watershed BMPs not accounted

| Existing Nutrient Load | TP (kg/yr) | TN (kg/yr) |
|--------------------------------------|---------------|---------------|
| Canyon Lake Overflow | 4,379 | 19,475 |
| Modeled Local Runoff | 908 | 4,036 |
| Supplemental Water (7.5MGD EVMWD) | 7,255 | 72,551 |
| Total External Load | 12,542 | 96,062 |



Set Load Reduction Targets

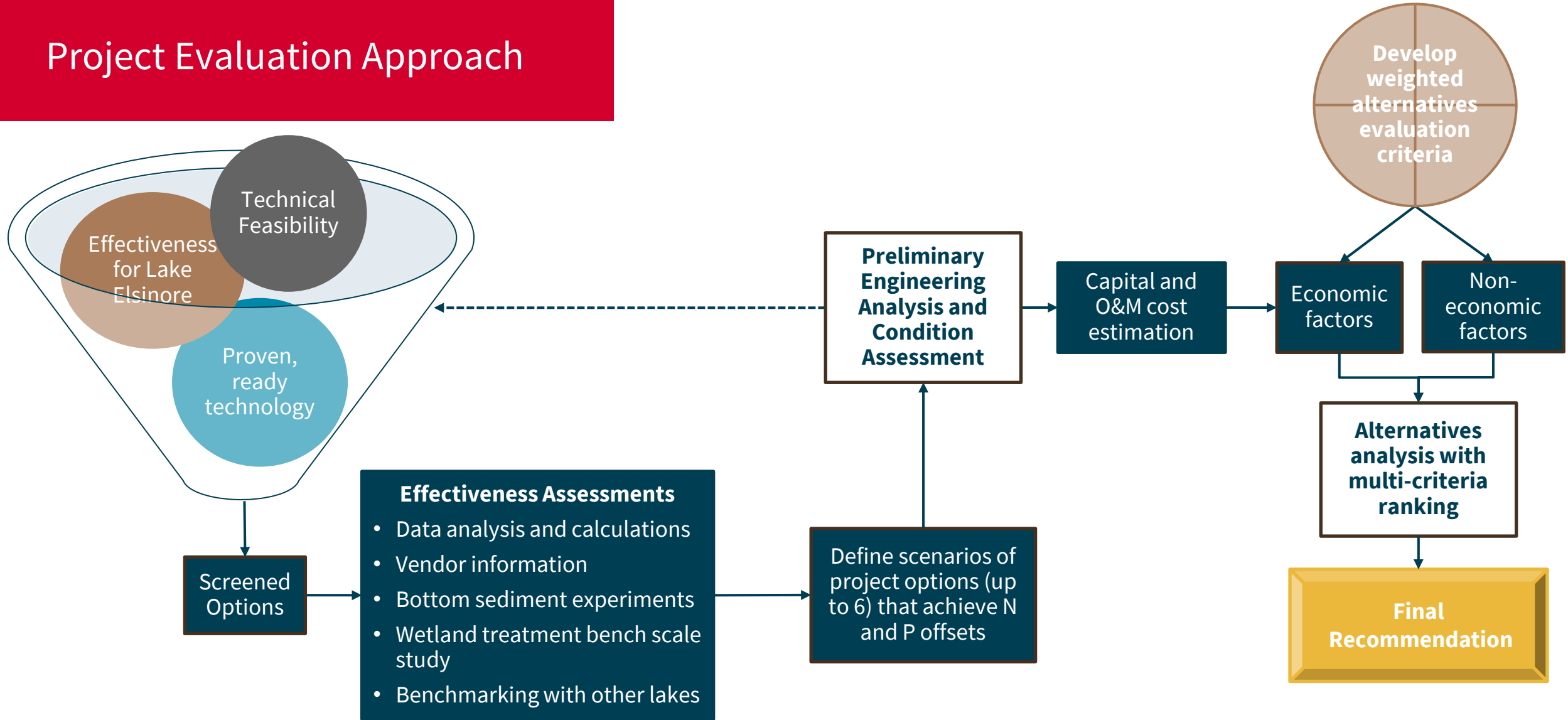
- Offset demand for all external loads to meet revised TMDLs
- Project sized to achieve these estimated annual load reductions
- Reduction targets for system sizing only
- Actual future compliance demonstration with offsets based on measured long-term average annual load

| Loading (kg/yr) | TP | | TN | |
|--|--------------|--------------|---------------|---------------|
| | Interim | Final | Interim | Final |
| Estimated Existing Load (All Sources) | 12,542 | 12,542 | 96,062 | 96,062 |
| External Allocations (Draft TMDL Revision) | 7,177 | 3,588 | 20,633 | 15,250 |
| Load Reduction to Meet Future TMDLs | 5,365 | 8,953 | 75,429 | 80,812 |

- 24-41 percent of current internal TP load
- 41-44 percent of current internal TN load

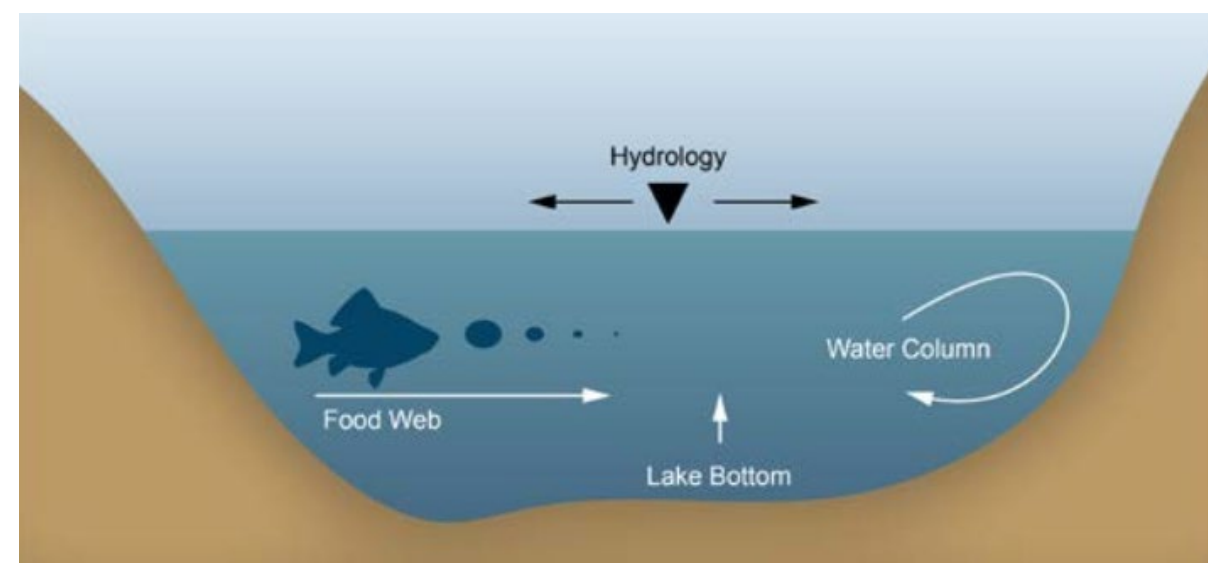


Project Evaluation Approach



List of Options

- List of options, excludes enhanced WWTP methods or watershed BMPs



| Target | Control categories | Options (17) |
|--------------|-----------------------------------|---|
| Lake Bottom | Reduce sediment nutrient flux | Oxygenation or aeration, destratification and lake mixing |
| | Inactive sediment | Dredging, physical liners |
| | Treat sediment | Chemical sediment sealing |
| Water Column | Chemical addition to water column | Herbicides |
| | Recirculating systems | Wetland filters |
| | Removal systems | Macrophyte harvesting, algae harvesting |
| Food Web | Increase competition with algae | Pathogens of algae or macrophytes, fish grazers on algae or macrophytes, biomanipulation, shading |
| | Fishery management | Nutrient harvesting from fish or algae |
| Hydrology | Hydrologic changes | Water level fluctuation, dilution/flushing, selective withdrawal of hypolimnion water |

Ongoing Vendor Coordination

- ECO2
- Blue-in-Green
- Moleaer
- Gantzer Water
- AECOM
- EutrophiX



Q&A

- Seeking insight from stakeholder throughout the project
- Next Meeting
 - Coordinate with stakeholders on evaluation criteria
 - Provide update on sediment study and hydrodynamic simulations

